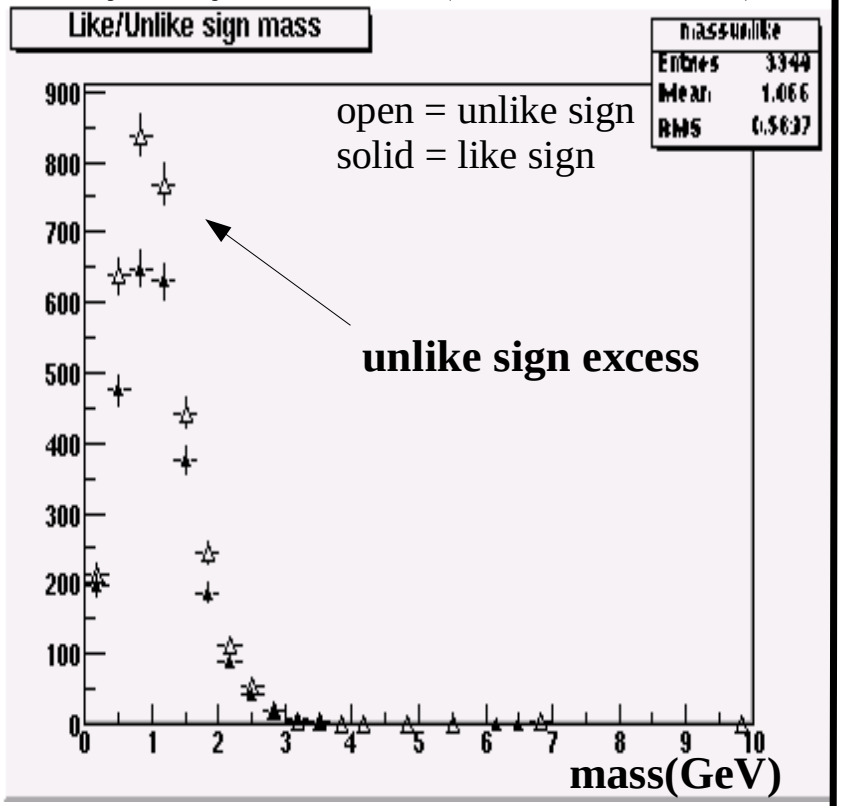
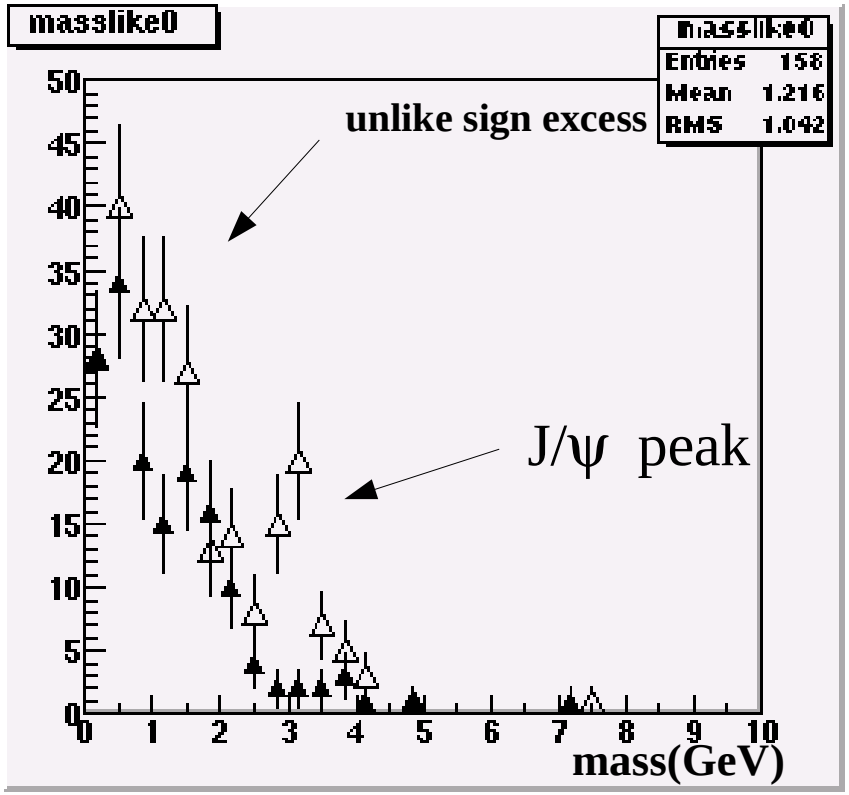
About like-sign subtraction:

PYTHIA (msel=2, all QCD processes) background simulation, pions and kaons forcibly decayed to muons (a.l.a. Dave Brown).

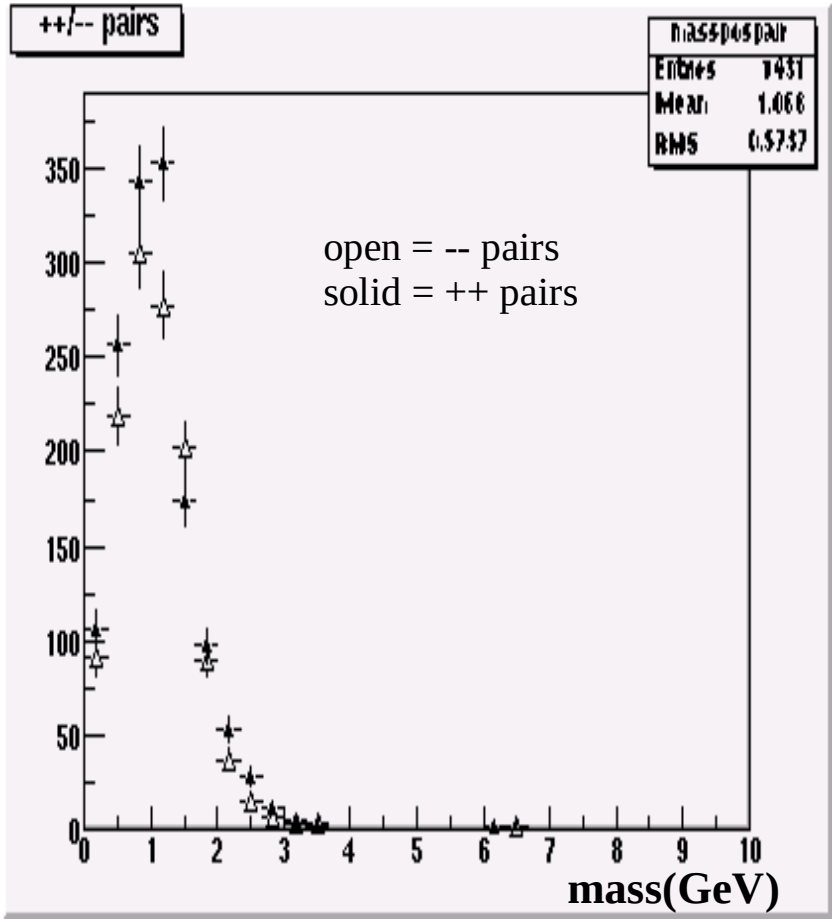


Real pp data

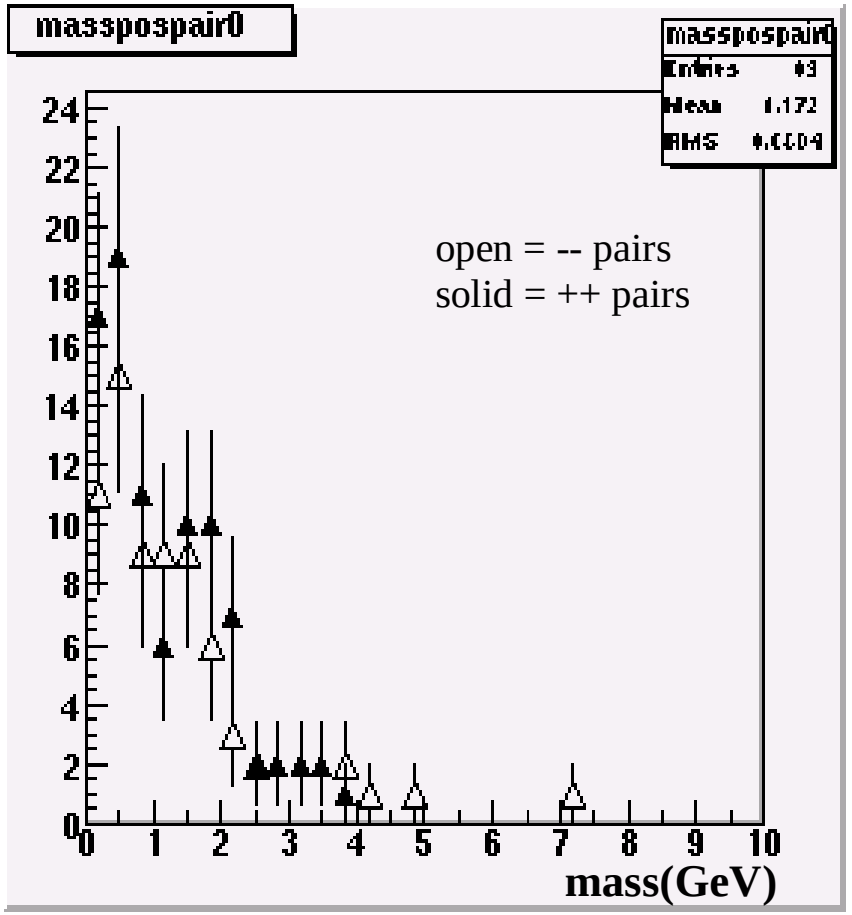


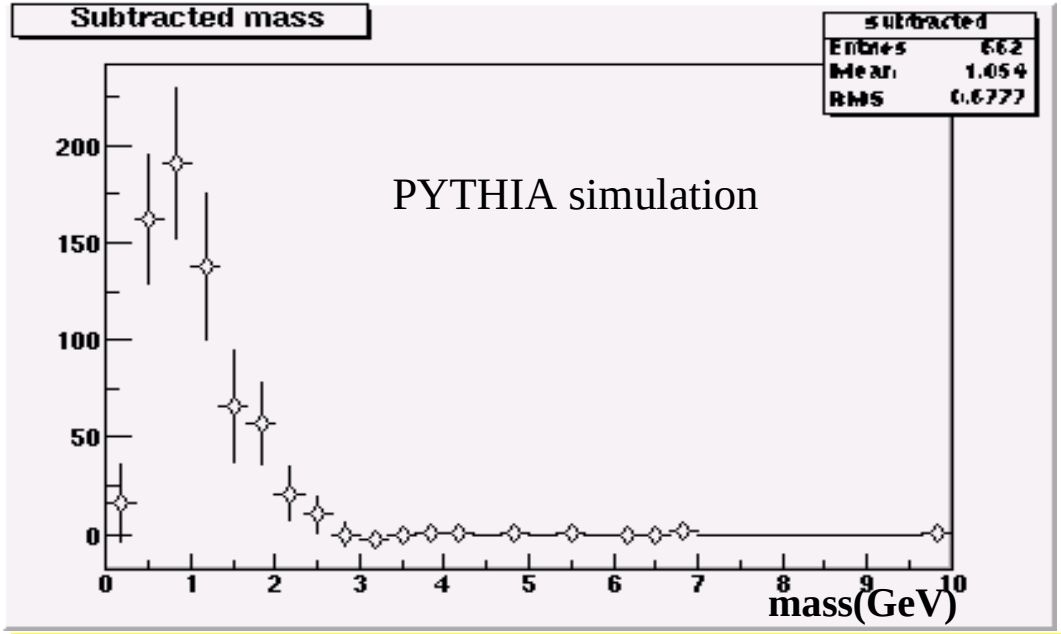
++/-- pairs:

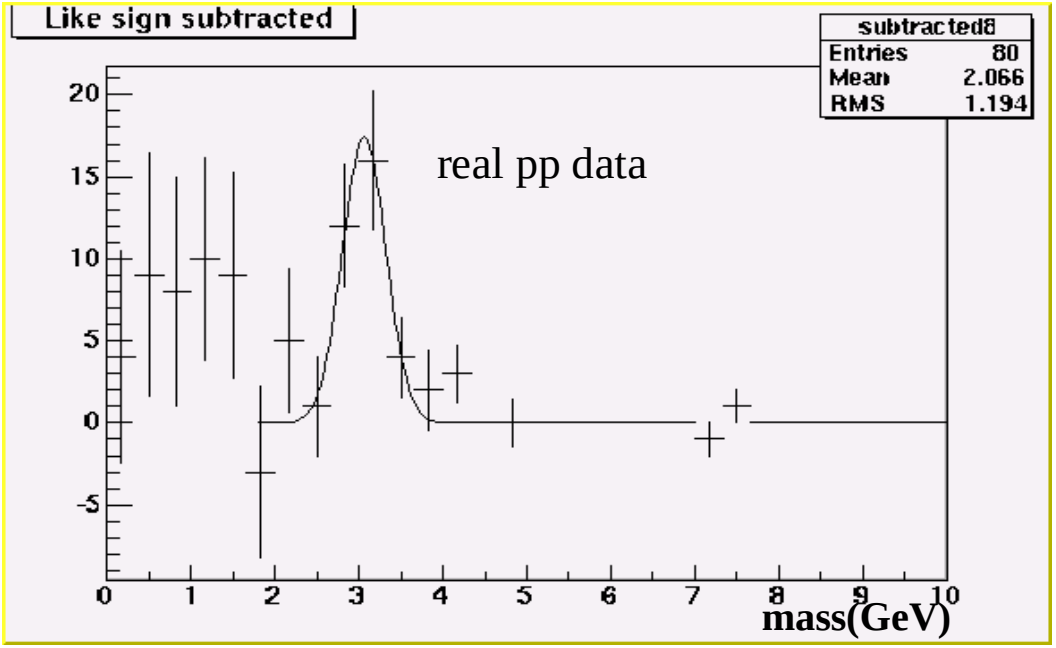
PYTHIA simulation



real pp data

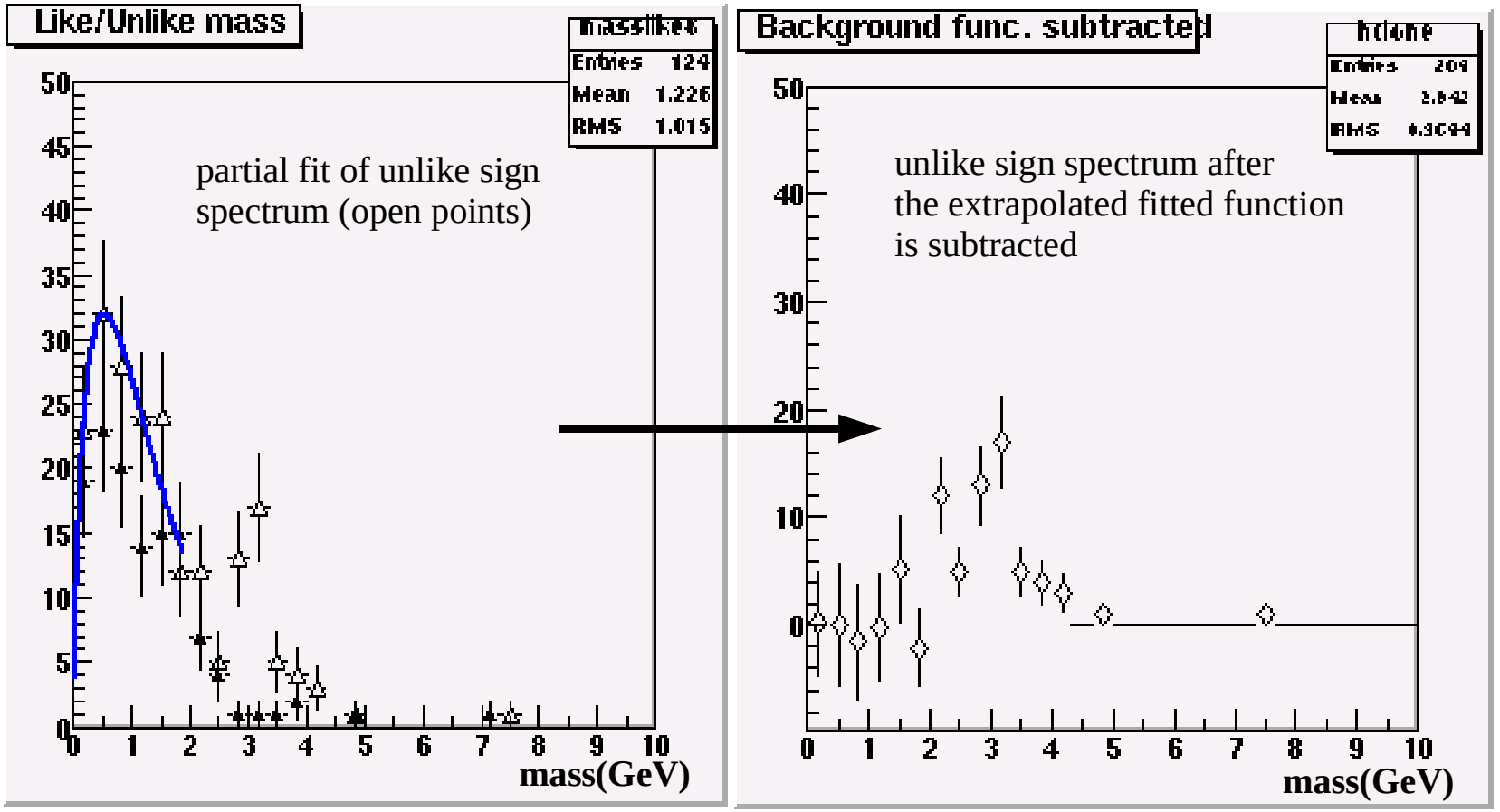




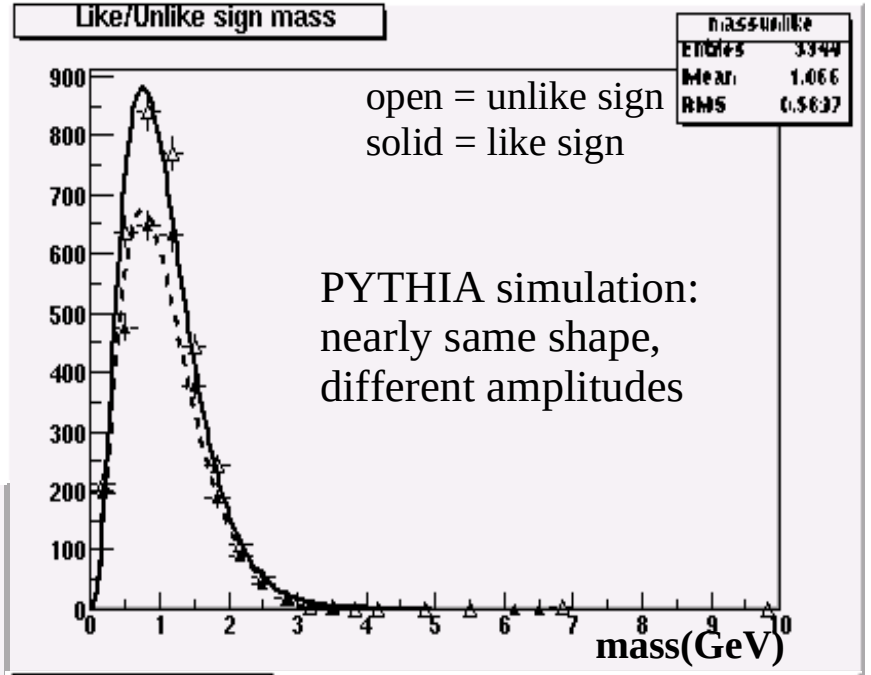


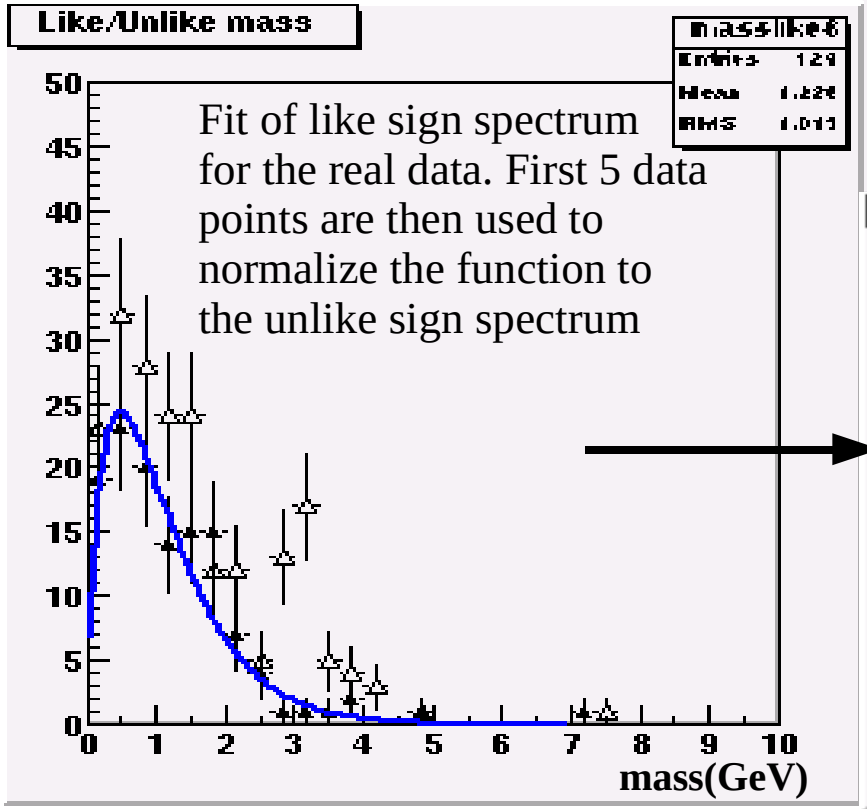
When subtracting like sign from unlike sign spectrum, non-cancellation in low mass region is observed in simulation as well as the real data.

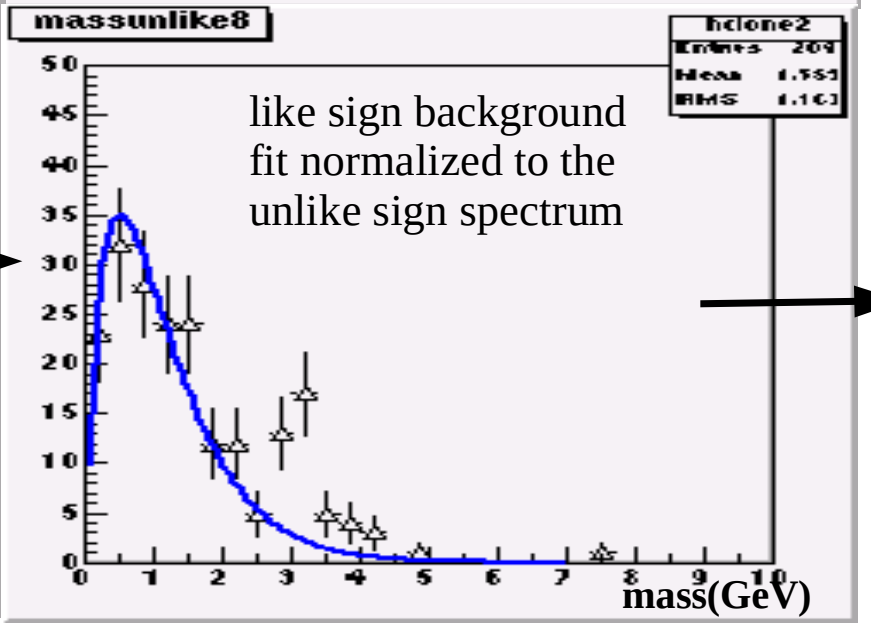
Idea 1: Fit the unlike sign spectrum in the low mass range, extrapolate it over entire mass range, and subtract the function from the unlike sign spectrum.

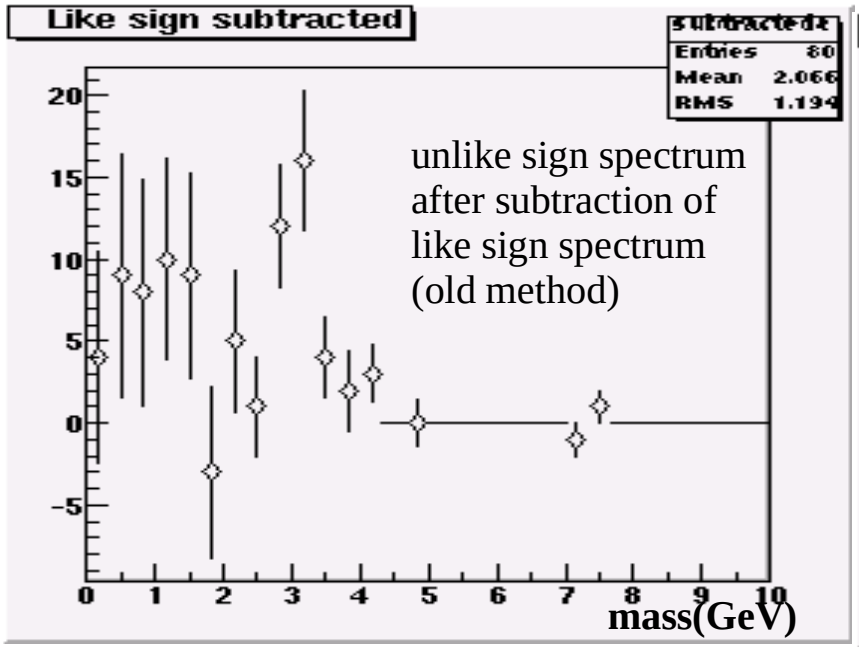


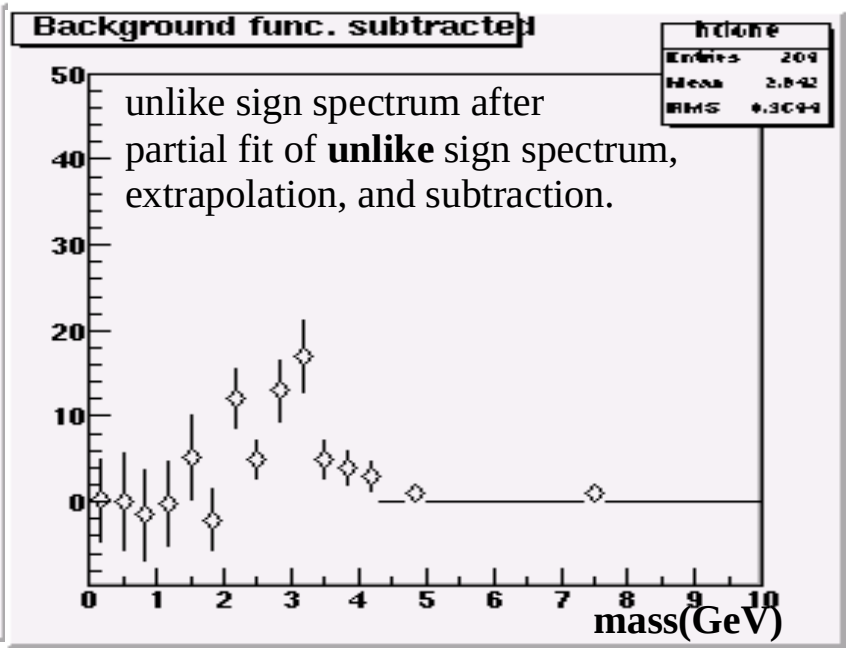
Idea 2: Given our statistics, maybe we can fit the like sign spectrum over the entire range and scale it up to approximate the unlike-sign spectrum, then subtract that scaled function from the unlike sign spectrum.

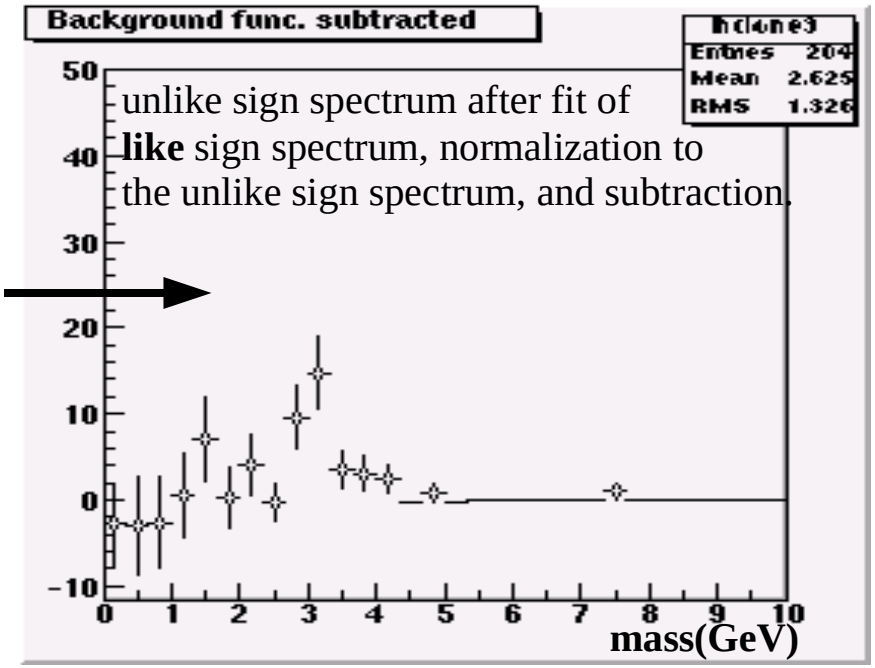






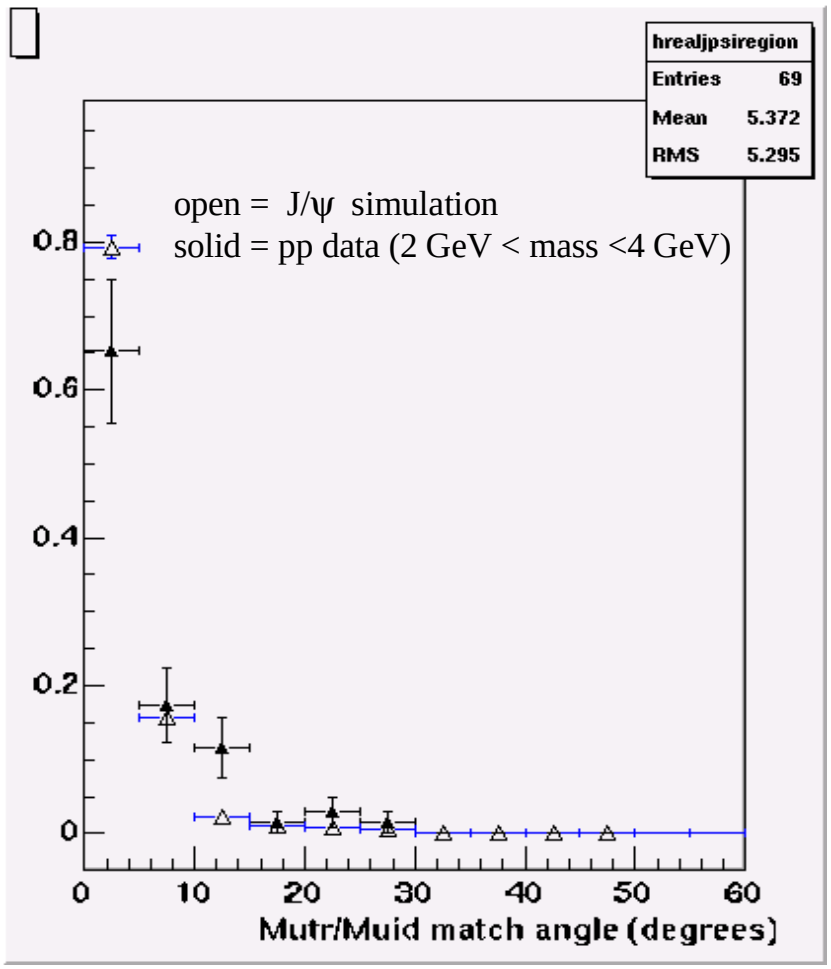

Like sign subtracted
Entries 80
Mean 2.066
RMS 1.194
unlike sign spectrum after subtraction of like sign spectrum (old method)
mass(GeV)

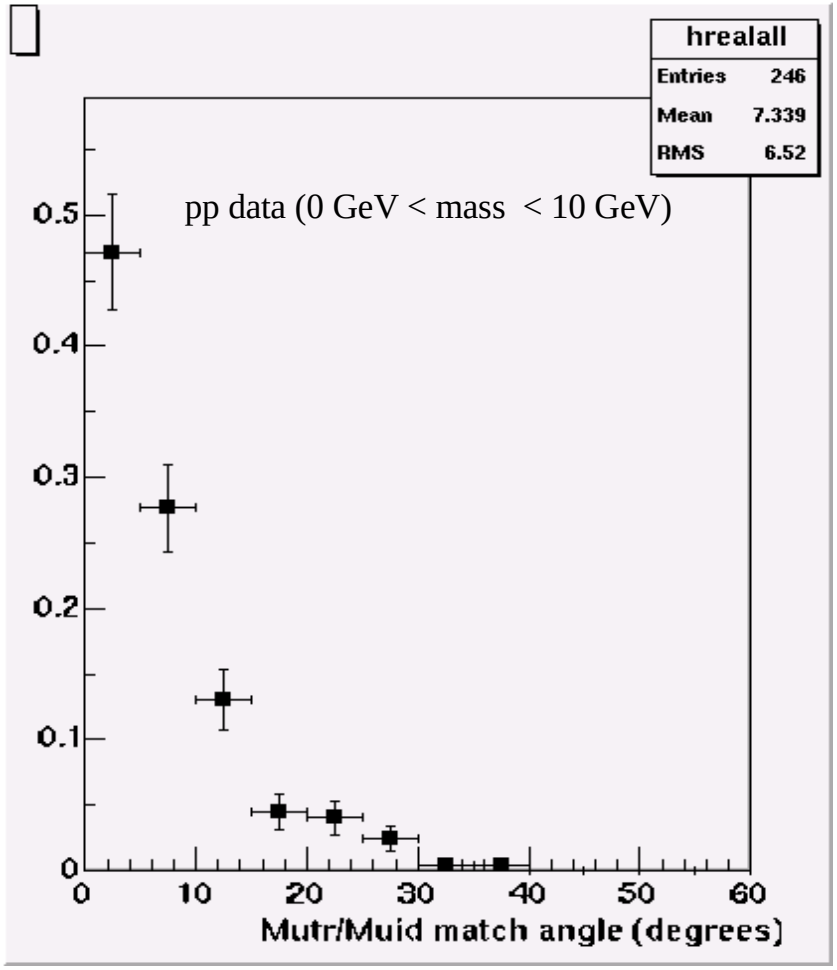

Background func. subtracted
Entries 209
Mean 2.842
RMS 0.3094
unlike sign spectrum after partial fit of **unlike** sign spectrum, extrapolation, and subtraction.
mass(GeV)


Background func. subtracted
Entries 204
Mean 2.625
RMS 1.326
unlike sign spectrum after fit of **like** sign spectrum, normalization to the unlike sign spectrum, and subtraction.
mass(GeV)

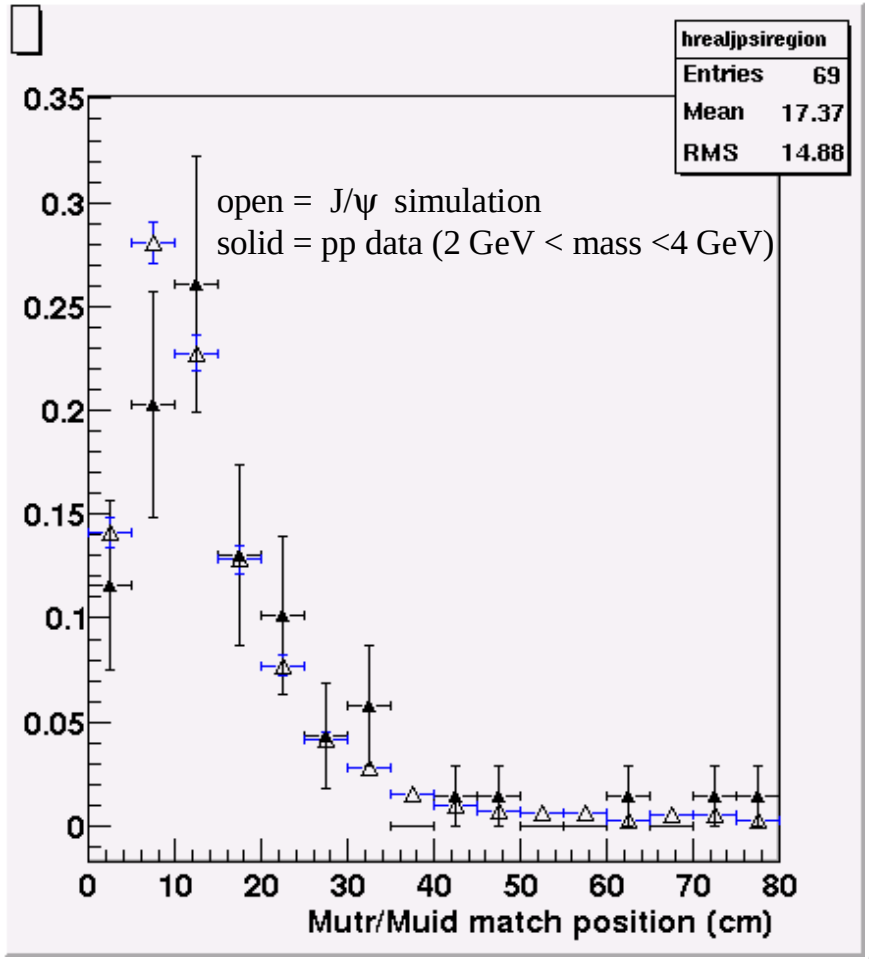
Comparison of J/ψ embedded simulation to real pp data

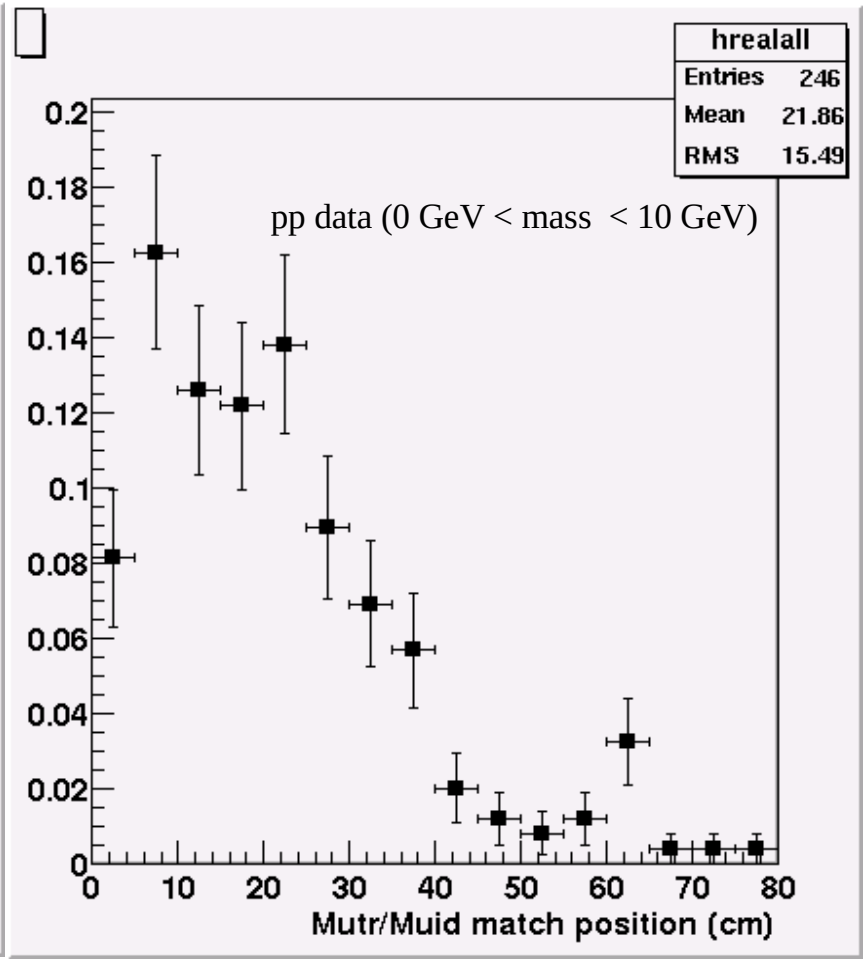
Mutr track/Muid road match angle



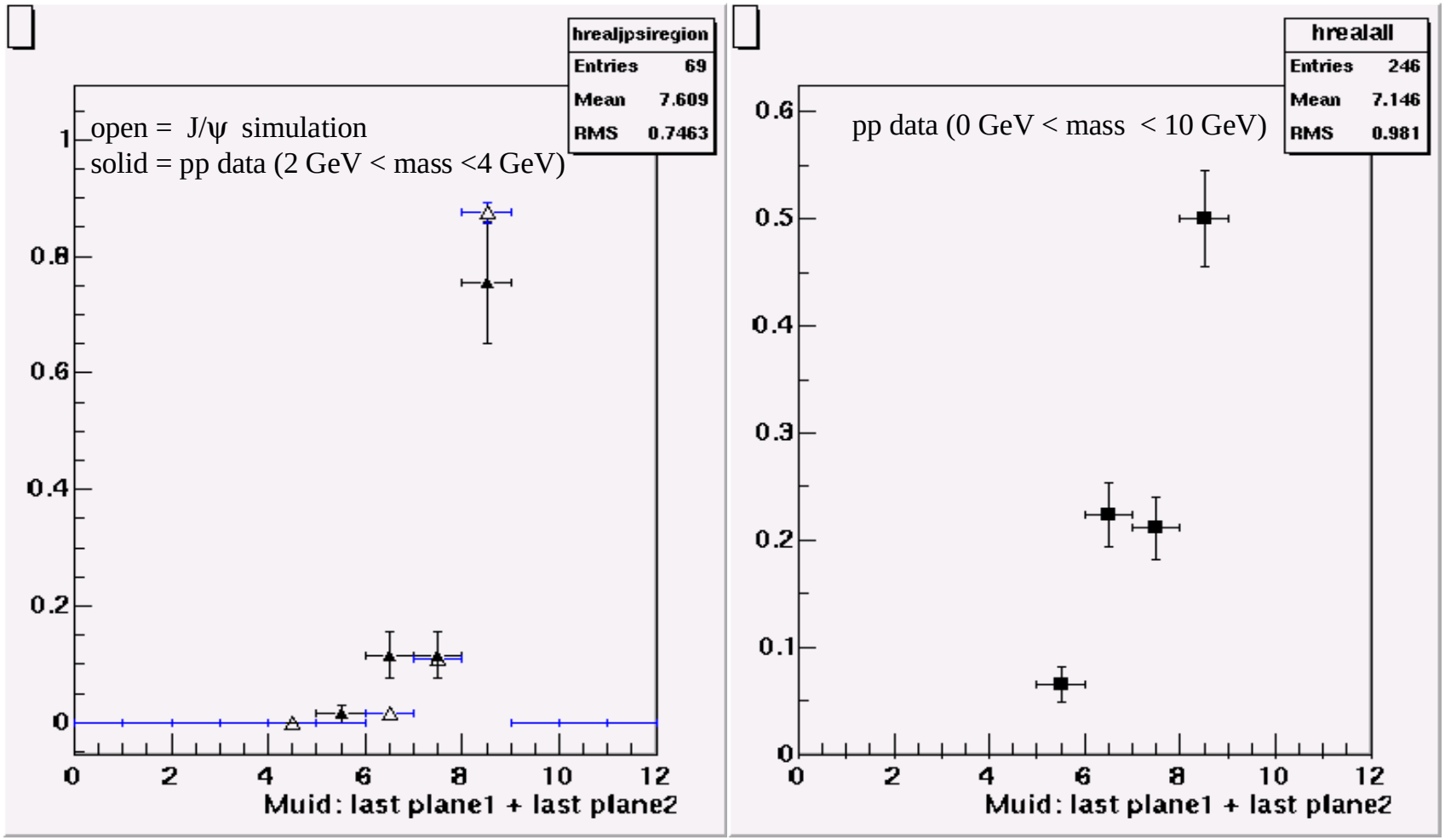


Mutr track/Muid road match position

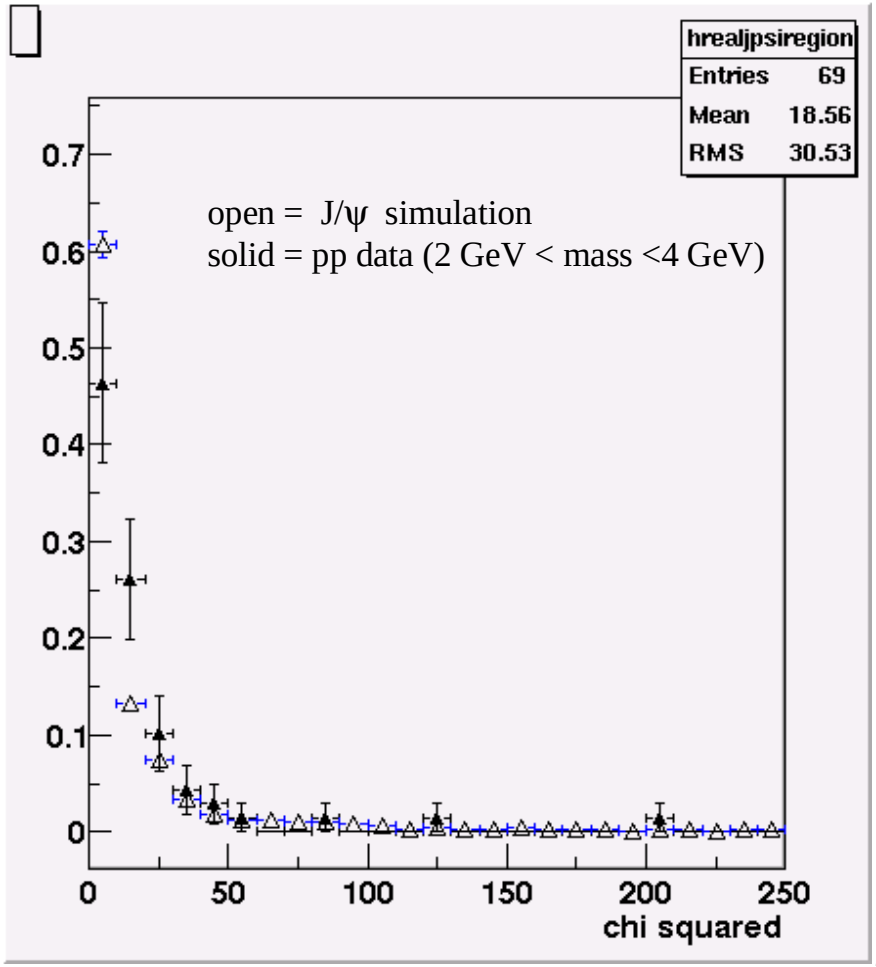


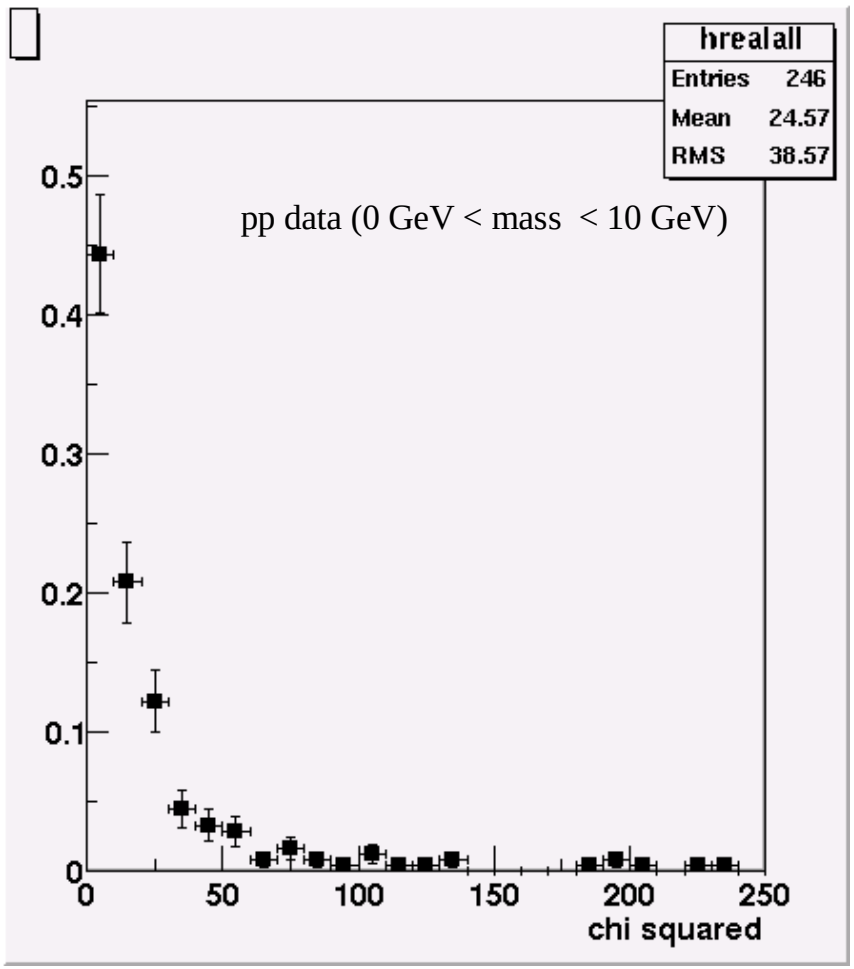


Muid: last plane muon 1 + last plane muon 2

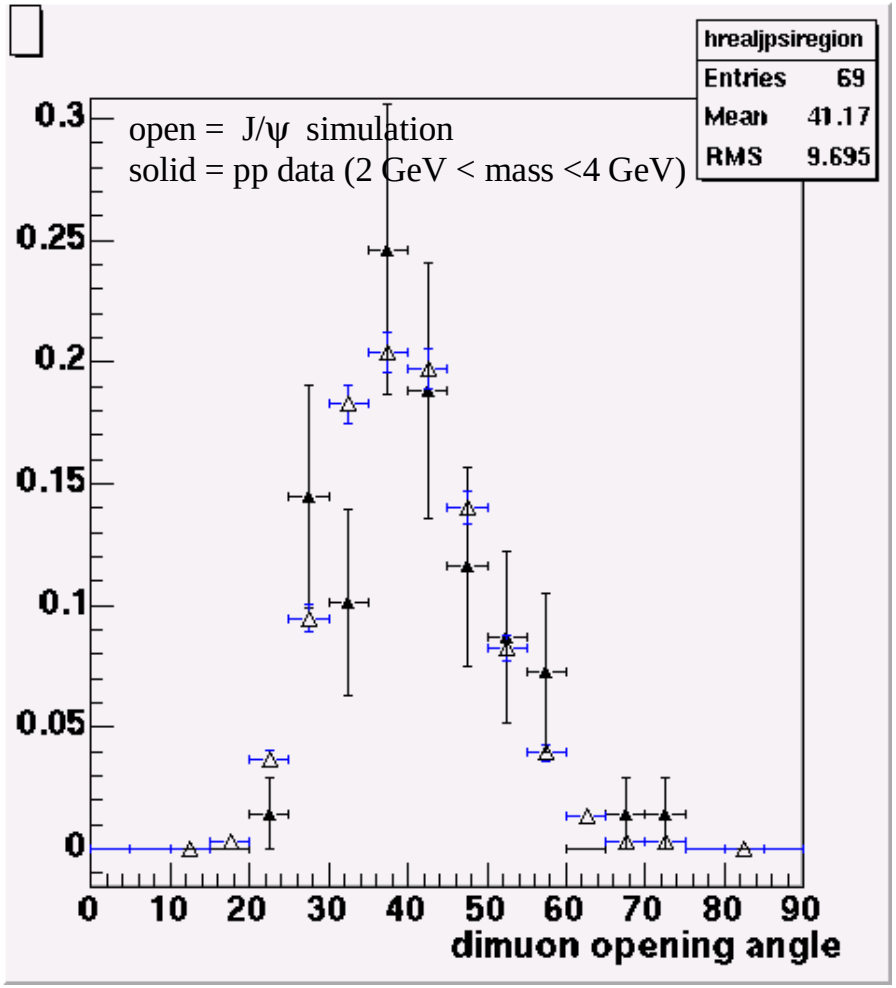


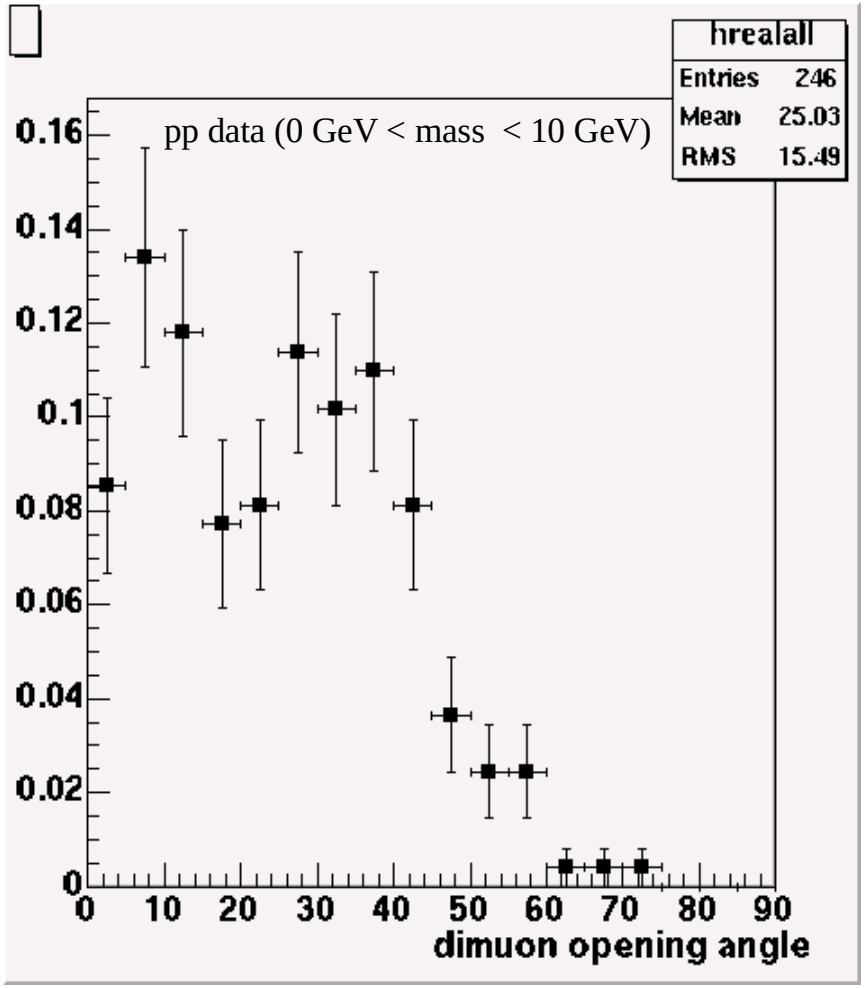
Chi squared for muon tracks



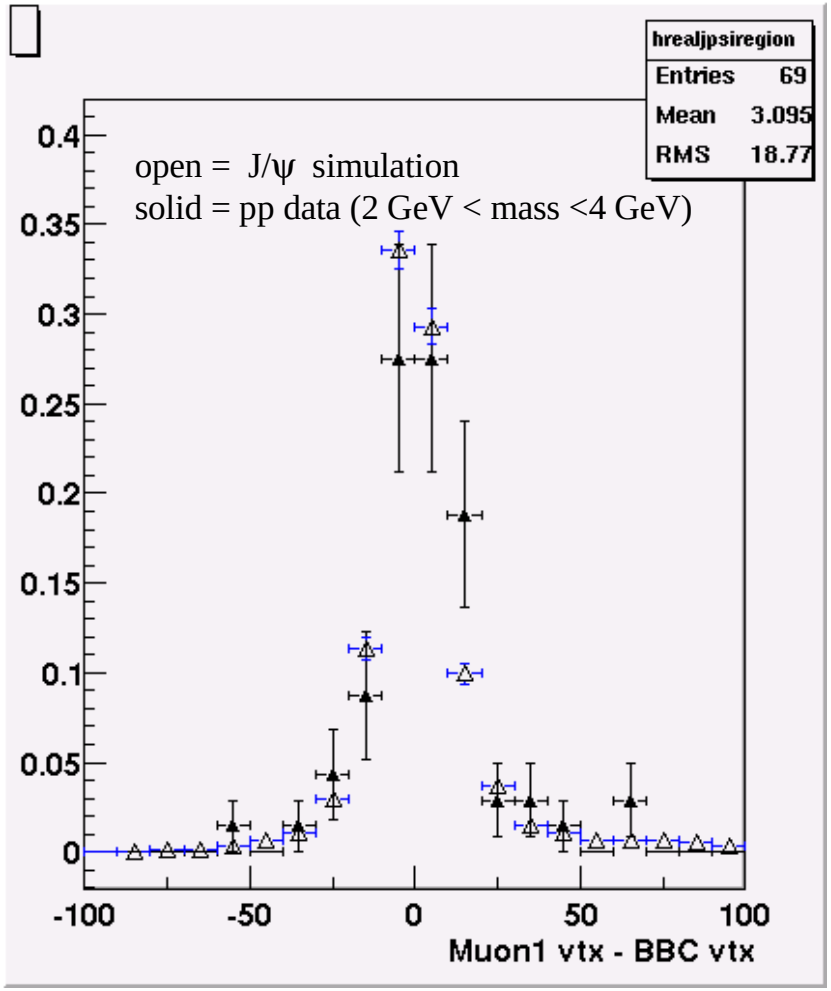


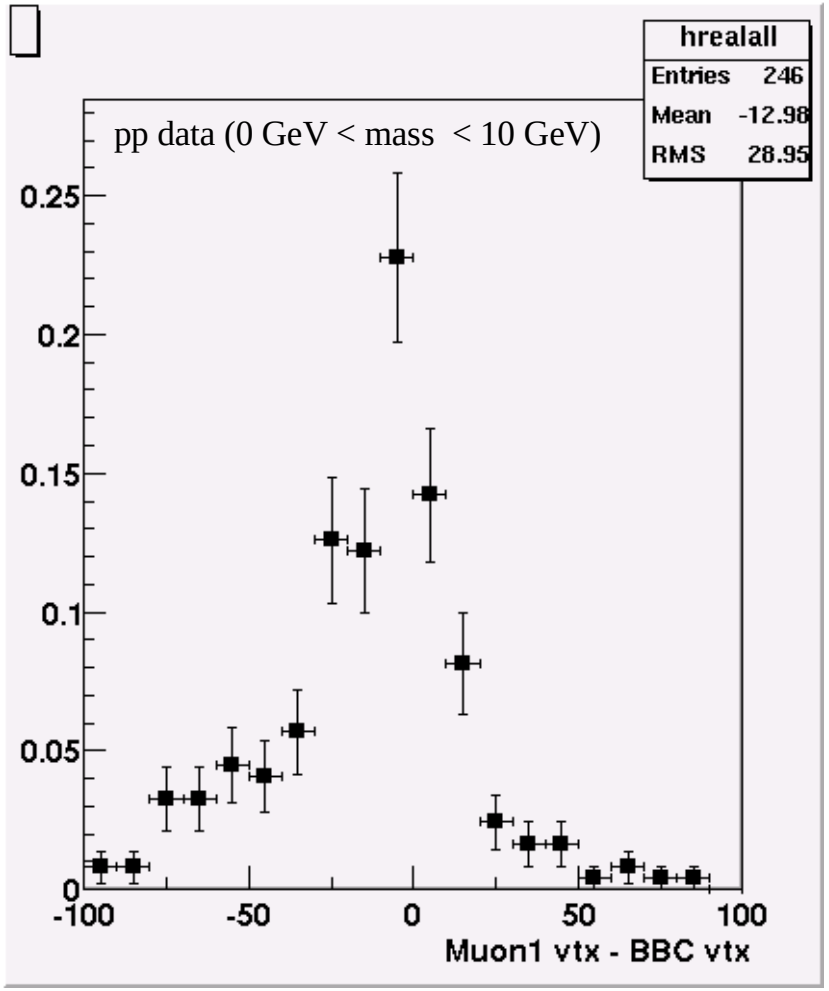
Opening angle of dimuon pair





Muon vertex - BBC vertex





Muon1 vertex - Muon2 vertex